

NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. LOCK 32 - ERIE CANAL (INVENTORY NU--ETC(U)
SEP 80 B L THOMSEN, G L WOOD DACW51-79-C-0001

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⑥ National Dam Safety Program,
LOCK 32 - ERIE CANAL
(Inventory Number N.Y. 791),
MONROE COUNTY, NEW YORK.
~~INVENTORY NUMBER 791~~
PHASE I INSPECTION REPORT,
NATIONAL DAM SAFETY PROGRAM

⑪ SEP 80

⑫ 58

⑮ DACW51-79-C-0001



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Prepared by
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Prepared for
DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
NEW YORK, NEW YORK

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| 20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, increased maintenance | | |

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is required to correct concrete deterioration in the general lock area, of the spillway intake structure, and of the foot bridge which crosses the spillway discharge pool. Also, a detailed emergency operation-action plan and warning system should be developed and implemented.

No additional investigations are deemed necessary at this time. Because flow to Lock 32 is controlled by other structures, no hydrologic/hydraulic analyses were possible.

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, DC 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
LOCK 32 ERIE CANAL
I. D. NO. N.Y. 791

MONROE COUNTY, NEW YORK

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

NAME OF DAM: Lock 32 Erie Canal
I.D. No. N.Y. 791
STATE LOCATED: New York
COUNTY LOCATED: Monroe
WATERSHED: Seneca River
STREAM: New York State Barge Canal
DATE OF INSPECTION: June 12, 1980

From p2
ASSESSMENT

→ Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, increased maintenance is required to correct concrete deterioration in the general lock area, of the spillway intake structure, and of the foot bridge which crosses the spillway discharge pool. Also, a detailed emergency operation-action plan and warning system should be developed and implemented. ↙

No additional investigations are deemed necessary at this time.

Because flow to Lock 32 is controlled by other structures, no hydrologic/hydraulic analyses were possible.

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APPROVED BY

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Colonel W. M. Smith, Jr.
New York District Engineer



Overview Photo of
Upstream Works



Overview Photo of
Lock 32

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
LOCK 32 ERIE CANAL
I.D. NO. N.Y. 791
MONROE COUNTY, NEW YORK

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Dam Inspection Act, Public Law 92-367.

b. Purpose of Inspection

This inspection was conducted to evaluate the existing conditions of the lock and its appurtenant structures, to identify deficiencies and hazardous conditions, to determine if they constitute hazards to human life and property, and to recommend remedial measures where necessary.

1.2 DESCRIPTION OF PROJECT

a. Description of the Lock and Appurtenant Structures

Lock 32 is a concrete, pile supported structure set in an earth embankment. The interior of the lock is approximately 340 feet long, 44 feet wide, and 40 feet deep. There are vertically hinged gates at the west (upstream) and east (downstream) end of the lock. The approximate head differential is 25 feet.

The only spillway is located south (See layout plan and sections, Appendix D, for compass directions) of the lock. It is an open, riprap-lined channel approximately 1000 feet in length. The entrance to the spillway consists of five gates, each approximately 8½ feet wide. These

gates are equipped with stoplogs. The downstream end of the spillway consists of a double box culvert under Route 65. This culvert empties into a pool at the downstream end.

b. Location

The lock is located on the Erie Canal of the New York State Barge Canal system, south of the City of Rochester, and just west of the Village of Pittsford. It is near the intersection of Routes 252 and 65.

c. Size Classification

→ This lock has a head of approximately 25 feet, and a storage volume of approximately 360 acre-feet. Therefore, it is classified as a small dam. → *cont. p 2*

d. Hazard Classification

The dam is classified "high" hazard because of downstream residences and the potential impact on navigation.

e. Ownership

Lock 32 is owned by the New York State Department of Transportation, Waterways Maintenance Subdivision. The controlling office is located near Rochester, New York.

New York State Department of Transportation
Region 4
Jefferson Road
Rochester, New York
Mr. Clarence Burkwit
716-442-8550

f. Purpose of the Dam

The sole purpose of Lock 32 is to facilitate navigation along the New York State Barge Canal. The impounded waters behind the dam provide a storage pool used for gravity inflow to the lock.

g. Design and Construction History

The New York State Barge Canal in the vicinity of Lock 32 is an artificial waterway. Plans are dated 1908, and the lock was constructed a short time after this.

h. Normal Operational Procedures

During the navigation season, the upstream and downstream water levels are maintained as nearly as possible to the design levels of 487.5 (BCD-Barge Canal Datum) and 462.4 (BCD). These levels are established by the spillway stoplogs in the upstream and downstream locks, as well as this one. Manipulation of these stoplogs is not normally required. Staff gauge readings upstream and downstream of the lock are recorded daily. During the winter, the canal in the vicinity of Lock 32 is drained by closing the inlet gates at the Genesee River, some 5 miles upstream.

1.3

PERTINENT DATA

a. Elevations (Barge Canal Datum-BCD)

| | |
|--|--------|
| Top of Dam | 490.0 |
| Design Pool | 487.5 |
| Maximum Recorded Pool | 488+ |
| Spillway Crest (Minimum) | 485.5 |
| Spillway Crest (Maximum) | 490.0 |
| Streambed at Dam Centerline (Upstream) | 475.5+ |
| Streambed at Dam Centerline (Downstream) | 450.4+ |
| Design Tailwater | 462.4 |
| Maximum Recorded Tailwater | 463+ |

b. Reservoir (feet)

| | |
|-----------------------|-------|
| Length of Normal Pool | 6800+ |
|-----------------------|-------|

c. Storage (acre-feet)

| | |
|-------------|------|
| Normal Pool | 360+ |
|-------------|------|

d. Reservoir Surface (acres)

| | |
|-------------|-----|
| Normal Pool | 30+ |
|-------------|-----|

e. Dam

| | |
|---------------|-------|
| Type | Lock |
| Length | 350'+ |
| Height (Head) | 25'+ |
| Top Width | 50'+ |

f. Spillway

| | |
|-----------------|--|
| Type | Open Channel (Rip-Rap lined) |
| Crest Elevation | 485.5-490.0 |
| Gates | 5 gates, each 8.5' wide, with stoplogs |

SECTION 2: ENGINEERING DATA

2.1 GEOTECHNICAL DATA

a. Geology

Lock 32 is located approximately 1.5 miles west of Pittsford, a southeastern suburb of Rochester, New York.

The site lies north of the Onondaga Escarpment, a cuesta which trends east-west across upstate New York, and therefore, is situated in the Erie-Ontario Lowlands physiographic province. This province is characterized by the general low relief of a glacial lake plain, above which rise hills and drumlins composed of glacial till and bedrock.

Bedrock in the immediate Lock 32 vicinity consists of the Upper Silurian Salina Group of interbedded shales, siltstones, dolostones and evaporites. The shale and siltstone units are characteristically gypsiferous and many units are known to be cavernous. Despite a regional southward dip, stratification may be considered horizontal over short distances; no major or active faults are to be found in the area. The depth to bedrock is uncertain.

Lock 32 is situated in a region classified as Zone 3 seismicity, as shown on Figure 1 of the Recommended Guidelines for Safety Inspections of Dams.

Pleistocene glaciation of the region has left, as its most marked effect, extensive fine-grained lacustrine deposits which once formed the floor of proglacial Lake Iroquois. Subsequent to final retreat of the Wisconsin Stage ice sheet and reduction of Lake Iroquois to present Lake Ontario, drainage channels dissecting the lake plain became the site of stratified sand and gravel outwash deposits. Throughout the lacustrine phase, uplands of sufficient elevation such as drumlins and knolls of till and bedrock, remained free of sedimentation.

b. Subsurface Investigations

No records of subsurface investigations were available. Based upon the available plans and the site characteristics, it appears that the lock and spillway intake are founded on piles. The lengths and type(s) of the piles are uncertain.

2.2 DESIGN/CONSTRUCTION RECORDS

Plans dated 1908 and identified as Contract 23 show the existing lock, spillway, and appurtenant structures as they presently exist. Selected drawings are included in Appendix D.

2.3 OPERATION RECORDS

This site has an attendant on a continuous basis during the navigation season. During the winter, the lock and canal are drained. Upstream and downstream water elevation readings are recorded daily during the navigation season. These levels are maintained as nearly as possible to the design levels of 487.5 (BCD) and 462.4 (BCD). The upstream level can be controlled by stoplogs at the spillway entrance.

2.4 EVALUATION OF DATA

The data presented in this report were obtained during the site inspection and from the files of the New York State Department of Transportation. The information is considered adequate for Phase I inspection purposes.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspection of the lock and appurtenant structures was conducted on June 12, 1980. The weather was generally fair. The upstream and downstream water elevations were 486.2 (BCD) and 462.5 (BCD) respectively.

b. Lock

The lock was observed in operation and no mechanical, electrical, or hydraulic problems were noted. Concrete deterioration was noted in the general lock area, including upstream and downstream dock walls.

c. Spillway

Concrete deterioration was noted at the spillway intake structure, and very significant concrete deterioration (including exposed reinforcing bars) was noted at the foot bridge which crosses the downstream spillway pool.

d. Upstream and Downstream Canals

The conditions of the canals upstream and downstream of the lock appeared to be satisfactory. Slopes in the Lock 32 vicinity are generally graded to 1 vertical on 2 horizontal. No signs of instability were noted.

3.2 EVALUATION OF OBSERVATIONS

The following deficiencies were noted, and are shown in the photographs in Appendix A.

- 1) Concrete deterioration in the general lock area.
- 2) Concrete deterioration of the spillway intake structure.
- 3) Concrete deterioration of the foot bridge.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

Normal practice is to maintain the upstream and downstream water elevations as nearly as possible to the design levels of 487.5 (BCD) and 462.4 (BCD). These levels are affected by Locks 33 (upstream) and 31 (downstream). The water level within the lock is gravity-controlled by means of valves.

4.2 MAINTENANCE OF LOCK

The lock is maintained by the New York State Department of Transportation. Most of the lock maintenance is performed on an as-needed basis, with the largest part of the work being done during the portions of the year when the canal is drained. Every year, one of the four lock gates and its motor and operating mechanism are overhauled. Increased maintenance is required to correct concrete deterioration in the general lock area, including upstream and downstream dock walls.

4.3 MAINTENANCE OF SPILLWAY AND APPURTENANT STRUCTURES

The spillway and its appurtenant structures are maintained by the New York State Department of Transportation. Increased maintenance is required to correct concrete deterioration of the spillway intake structure, and of the foot bridge which crosses the downstream spillway pool.

4.4 WARNING SYSTEM IN EFFECT

No apparent warning system is present.

4.5 EVALUATION

It appears that past maintenance practices have largely ignored the concrete portions of the lock and its appurtenances and additional maintenance now is required to correct concrete deterioration in the general lock area, of the spillway intake structure, and of the foot bridge. In addition, a detailed emergency warning system should be developed.

SECTION 5: HYDROLOGIC/HYDRAULIC

5.1 HYDRAULIC CHARACTERISTICS

The New York State Barge Canal in the vicinity of Lock 32 is an artificial waterway. There are no tributaries. Flow to the lock and its spillway can be controlled by the following structures:

- o The Court Street Dam in Rochester. This dam maintains the Genesee River at an elevation of approximately 513.1 (BCD) during the navigation season, and supplies water for the Barge Canal.
- o Gates near the intersection of the Barge Canal and the Genesee River. These gates, which can be lowered even in the event of a power failure, are designed to prevent excessively high river waters from entering the canal. The top elevation of these gates is approximately 524 (BCD).
- o Lock 33. Through the use of stoplogs, the spillway crest of this lock can be made as high as approximate elevation 517 (BCD).

5.2 ANALYSIS CRITERIA

Because the canal in the vicinity of Lock 32 is an artificial waterway, and flow to the lock is controlled by other structures, no conventional hydrologic/hydraulic analyses were possible.

5.3 SPILLWAY CAPACITY

The spillway capacity was computed using an equation for orifice flow, and assuming that the water surface elevation was at the top of the lock walls (elevation 490.0-BCD). It was also assumed that all stoplogs were removed. With this analysis, a discharge of 1510 cubic feet per second was obtained.

5.4 RESERVOIR CAPACITY

The canal between Locks 32 and 33 was estimated to have a water surface area of approximately 30 acres, and a design depth of approximately 12 feet. The approximate storage, therefore, was computed as 360 acre-feet. The surcharge depth of 2 1/2 feet between normal water level and the top of embankment adds approximately 75 acre-feet, for a total storage capacity of approximately 435 acre-feet.

5.5 FLOOD OF RECORD

The maximum upstream pool elevation at Lock 32 has been approximately 488 (BCD). This level was noted during an isolated occurrence when an unusually high amount of water was discharged through Lock 33.

5.6 OVERTOPPING POTENTIAL

There is no record of the lock and/or spillway ever being overtopped.

5.7 EVALUATION

Because flow to Lock 32 is controlled by other structures, no hydrologic/hydraulic analyses were possible.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

No visible evidence of structural instability was noted. The horizontal and vertical alignments, abutments, and joints between structural elements all appeared to be satisfactory. The concrete deterioration noted in the visual inspection does not affect structural stability (except that of the footbridge which does not affect the structure per se) at this time.

b. Stability Evaluation

No stability analyses (either overturning or sliding) were deemed applicable to this structure because of its configuration as a monolithic box.

A review of design parameters* for earth embankments of compacted sands and gravels indicates that embankment slopes of approximately 1 vertical on 2 horizontal will have adequate factors of safety with respect to shear failures.

Seismic stability was not considered during the design phase and was not evaluated as a part of this investigation since stability of the concrete structure was not applicable and there is no data available for stability analyses of the levee section.

*"Design of Small Dams", U.S. Department of Interior, Bureau of Reclamation, 1977.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Phase I inspection of Lock 32 did not reveal conditions which constitute an immediate hazard to human life or property. However, increased maintenance is required to correct deterioration in the general lock area, of the spillway intake structure, and of the foot bridge.

Because the flow to Lock 32 and its spillway is controlled by other structures, hydrologic/hydraulic analyses were not possible. In the event of a possible emergency (such as might result from impending failure of an upstream structure), however, continuous surveillance should be provided to warn of high floodwater conditions. Such surveillance procedures and other measures deemed necessary should be developed, documented, and placed in readiness for future use as part of a detailed emergency operation-action plan. A warning system should also be developed and implemented.

b. Adequacy of Information

The information available for preparation of this report is considered adequate.

c. Necessity for Additional Investigations

No additional investigations are deemed necessary at this time.

d. Urgency

The deficiencies noted in this investigation should be corrected before the next navigation season.

7.2

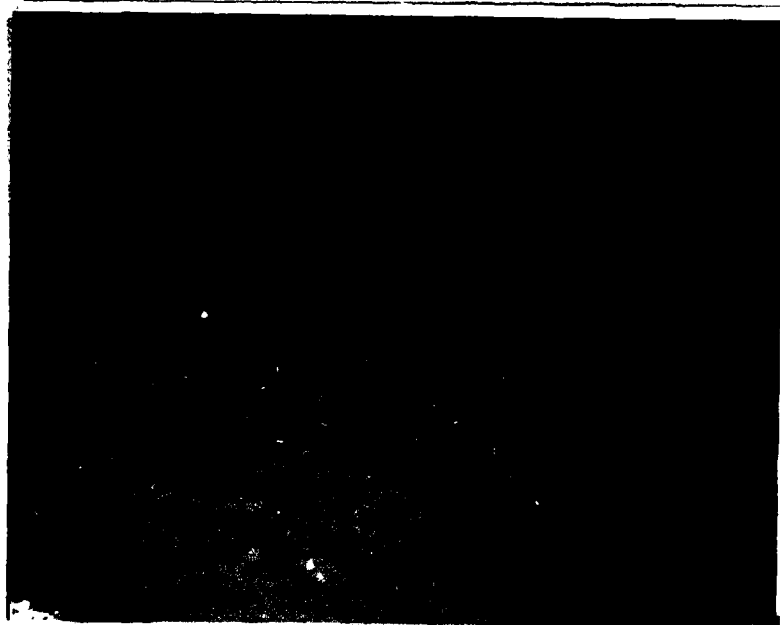
RECOMMENDED MEASURES

The following actions should be undertaken:

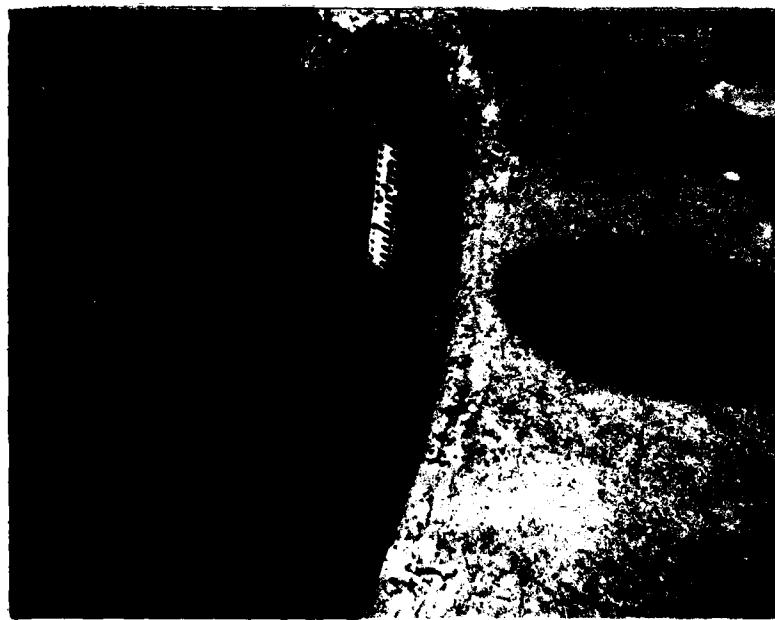
- a) Correct concrete deterioration in the general lock area, of the spillway intake structure, and of the foot bridge.
- b) Develop and implement a detailed emergency operation-action plan and warning system.

APPENDIX A

PHOTOGRAPHS



Concrete deterioration on
North Lock Wall



Upstream staff gauge;
NOTE: Concrete deterioration



Downstream staff gauge;
NOTE: Concrete deterioration

Concrete deterioration on
Downstream south wall



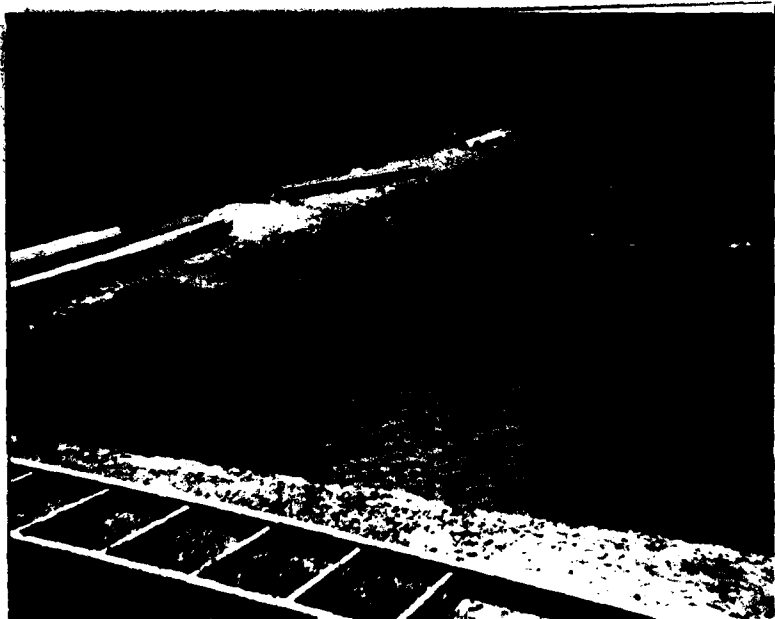
Leakage through upstream gates



Leakage through downstream
gates



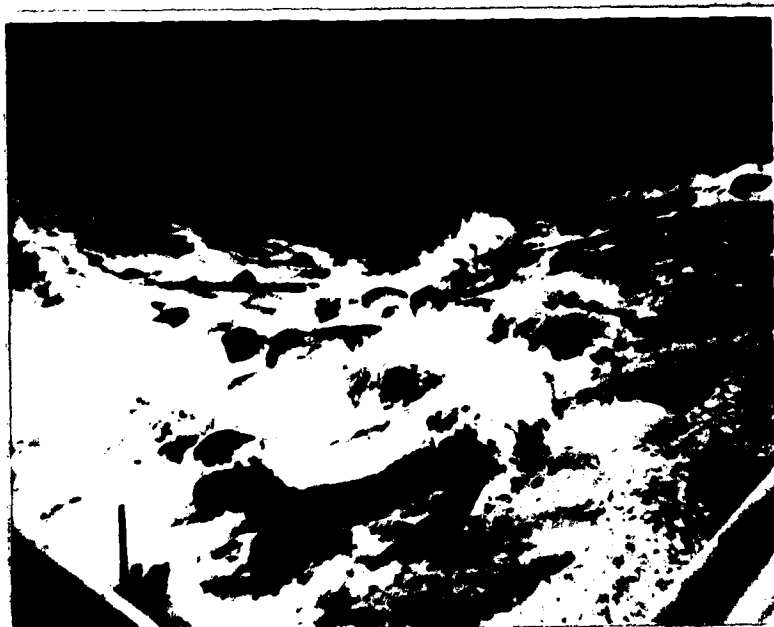
Spillway entrance;
NOTE: Concrete deterioration



Spillway entrance;
NOTE: Concrete deterioration



Upper spillway



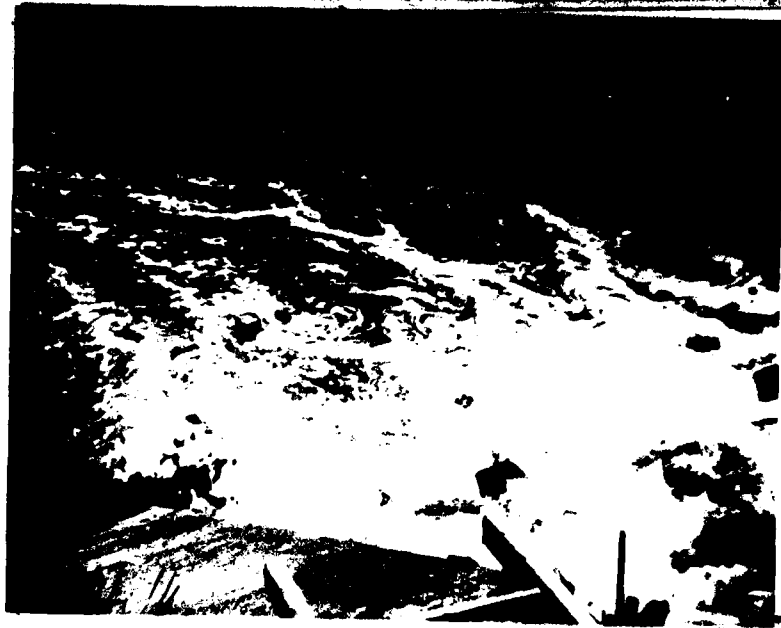
Box culvert and downstream
spillway pool



Lower spillway



Upper spillway





Foot bridge:
NOTE: Concrete deterioration
including exposed
reinforcing bars

APPENDIX B

VISUAL INSPECTION CHECKLIST

THOMSEN ASSOCIATES
CONSULTING GEOTECHNICAL ENGINEERS & GEOLOGISTS

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam LOCK 32 EAGLE CANAL
I.D. # 40 D DEC. Dam No. 791
River Basin SENECA RIVER
Location: Town PITTSFORD County MONROE
U.S.G.S. Quadrangle PITTSFORD
Stream Name EAGLE CANAL
Tributary of SENECA RIVER
Latitude (N) 43° 5' Longitude (W) 77° 32' 30"
Type of Dam LOCK
Hazard Category HIGH
Date(s) of Inspection 6/12/80
Weather Conditions SHINY
Reservoir Level at Time of Inspection 145.5 278.61
Tailwater Level at Time of Inspection 146.4

b. Inspection Personnel PA. T. ... (1-11)
PA. T. ... (170-5)

c. Persons Contacted (Including Address & Phone No.)
CLARENCE EICKHART, NYSDOT (716-442-8532)
DICK BRADLEY, NYSDOT (716-442-8532)

d. History:
Date Constructed 1908 Date(s) Reconstructed _____
(Plans)
Designer NEW YORK STATE
Constructed by NEW YORK STATE
Owner NYSDOT

e. Seismic Zone 2

THOMSEN ASSOCIATES
CONSULTING GEOTECHNICAL ENGINEERS & GEOLOGISTS

VISUAL INSPECTION CHECKLIST

2) Embankment

a. Characteristics

- 1) Embankment Material EARTH
- 2) Cutoff Type NONE
- 3) Impervious Core NONE
- 4) Internal Drainage System NONE
- 5) Miscellaneous

b. Crest

- 1) Vertical Alignment GOOD
- 2) Horizontal Alignment GOOD
- 3) Surface Cracks NONE NOTED
- 4) Miscellaneous

c. Upstream Slope

- 1) Slope (Estimate) (V:H) VARIES. ALL APPEAR STABLE
- 2) Undesirable Growth or Debris, Animal Burrows NONE NOTED
- 3) Sloughing, Subsidence or Depressions NONE NOTED

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VISUAL INSPECTION CHECKLIST

4) Slope Protection SLOPE: VEGETATED

5) Surface Cracks or Movement at Toe UNOBSERVABLE

d. Downstream Slope

1) Slope (Estimate - V:H) VARIES AL. APPROX. STAGE

2) Undesirable Growth or Debris, Animal Burrows NONE NOTED

3) Sloughing, Subsidence or Depressions NONE NOTED

4) Surface Cracks or Movement at Toe UNOBSERVABLE

5) Seepage NONE NOTED

6) External Drainage System (Ditches, Trenches; Blanket)

NONE OTHER THAN SPILLWAY

7) Condition Around Outlet Structure GENERALLY GOOD

8) Seepage Beyond Toe UNOBSERVABLE

e. Abutments-Embankment Contact

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CONSULTING GEOTECHNICAL ENGINEERS & GEOLOGISTS

VISUAL INSPECTION CHECKLIST

- 1) Erosion at Contact None Noted
- 2) Seepage Along Contract None Noted
- 3) Drainage System
- a. Description of System D.A.
- b. Condition of System D.A.
- c. Discharge from Drainage System D.A.
- 4) Instrumentation (Monumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.)
- 2 Staff Gages - 100'-110' 1 Piezo-110'

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VISUAL INSPECTION CHECKLIST

5) Reservoir

- a. Slopes GENERALLY GOOD
- b. Sedimentation UNOBSERVABLE
- c. Unusual Conditions Which Affect Dam NONE NOTED

6) Area Downstream of Dam

- a. Downstream Hazard (No. of Homes, Highways, etc.) SEVERAL HOMES
- b. Seepage, Unusual Growth NONE NOTED
- c. Evidence of Movement Beyond Toe of Dam NONE NOTED
- d. Condition of Downstream Channel GENERALLY GOOD

7) Spillway(s) (Including Discharge Conveyance Channel)

- a. General FLASHBOARDS; 5 GATES EACH 8.5' WIDE; GUEST VARIABLE 457.5 - 490.0; 50' WIDE; 1000'S LONE
- b. Condition of Service Spillway

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VISUAL INSPECTION CHECKLIST

c. Condition of Auxiliary Spillway N.A.

d. Condition of Discharge Conveyance Channel GOOD

8) Reservoir Drain/Outlet (BYPASS)

Type: Pipe _____ Conduit _____ Other TUNNEL

Material: Concrete _____ Metal _____ Other BRICK

Size: 5' x 7' Length APPROX. 700'

Invert Elevations: Entrance 467.0 Exit 461.9

Physical Condition (Describe): _____ Unobservable X

Material: _____

Joints: _____ Alignment _____

Structural Integrity: _____

Hydraulic Capability: _____

Means of Control: Gate _____ Valve X Uncontrolled _____

Operation: Operable X Inoperable _____ Other _____

Present Condition (Describe): APPARENTLY GOOD

THOMSEN ASSOCIATES
CONSULTING ENGINEERS

9) Structural

a. Concrete Surfaces SOME DETEGRATION

b. Structural Cracking NONE NOTED

c. Movement - Horizontal & Vertical Alignment (Settlement)

NONE NOTED

d. Junctions with Abutments or Embankments

APPEAR GOOD

e. Drains - Foundation, Joint, Face N.A.

f. Water Passages, Conduits, Sluices APPEAR GOOD

g. Seepage or Leakage SOME NOTED THROUGH
LOCK GATES

THOMSEN ASSOCIATES

CONSULTING PROFESSIONAL ENGINEERS - EDDY, CALIF.

h. Joints - Construction, etc. APIE. 15 GOOD

i. Foundation UNOBSERVABLE

j. Abutments GOOD

k. Control Gates GENERALLY GOOD

l. Approach & Outlet Channels GOOD

m. Energy Dissipators (Plunge Pool, etc.) N. A.

n. Intake Structures SOME CONCRETE DEGRADATION

o. Stability

p. Miscellaneous

APPENDIX C

HYDROLOGIC/HYDRAULIC:
ENGINEERING DATA AND COMPUTATIONS

THOMSEN ASSOCIATES

LO x 32

HYDROLOGIC/HYDRAULIC ANALYSES

DETERMINE MAXIMUM SPILLWAY CAPACITY
(WITH WATER SURFACE AT TOP OF WALLS,
ELEV. 490).

USE ORIFICE DISCHARGE EQUATION

$$Q = CA \sqrt{2gH}$$

$$C = 0.7$$

$$A = (5)(8.5)(4) = 170 \text{ ft}^2$$

$$g = 32.2 \text{ ft/sec}^2$$

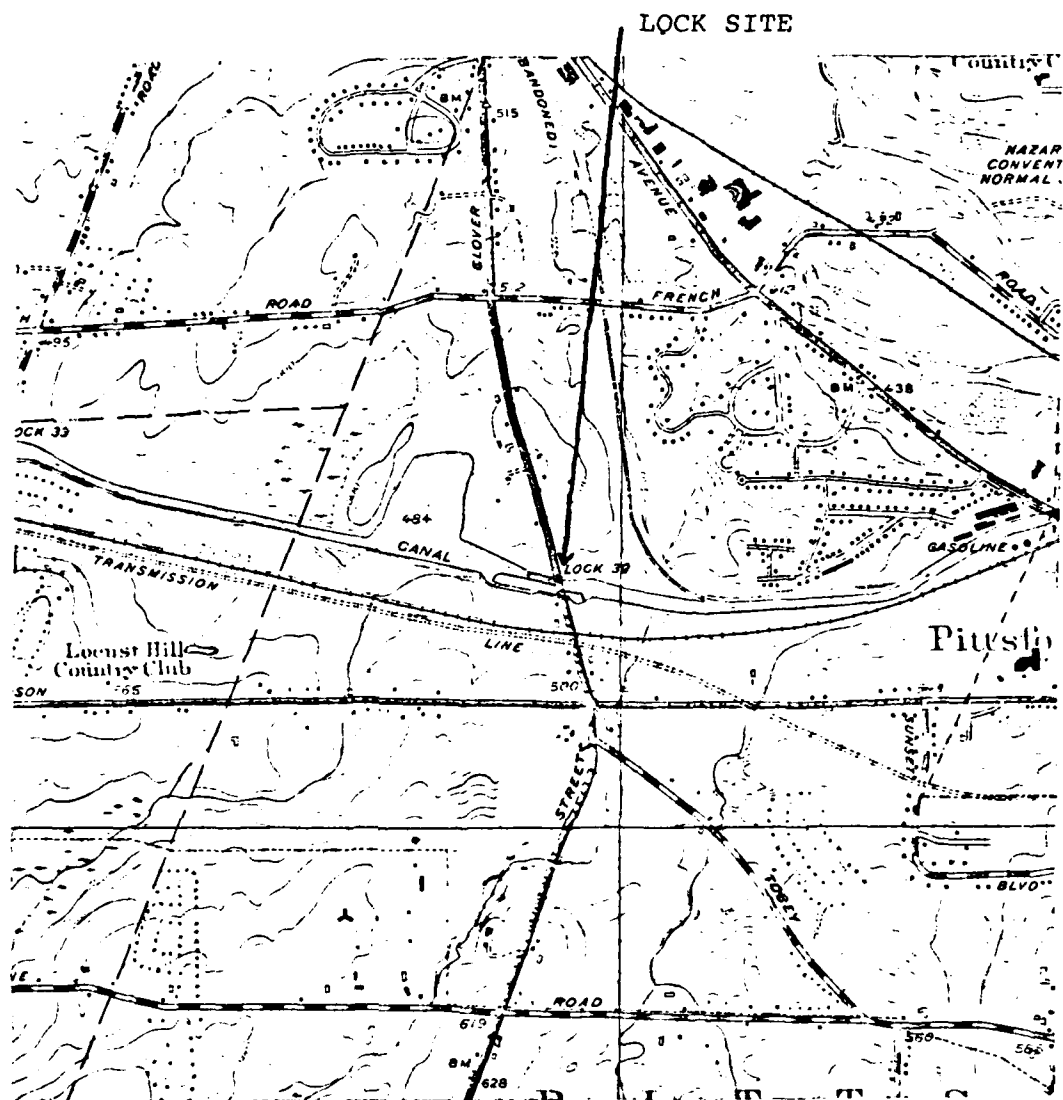
$$H = 490.0' - 487.5' = 2.5'$$

$$Q = (0.7)(170) \sqrt{(2)(32.2)(2.5)} = \underline{\underline{1510 \text{ cfs}}}$$

1 - 200 2/25/61

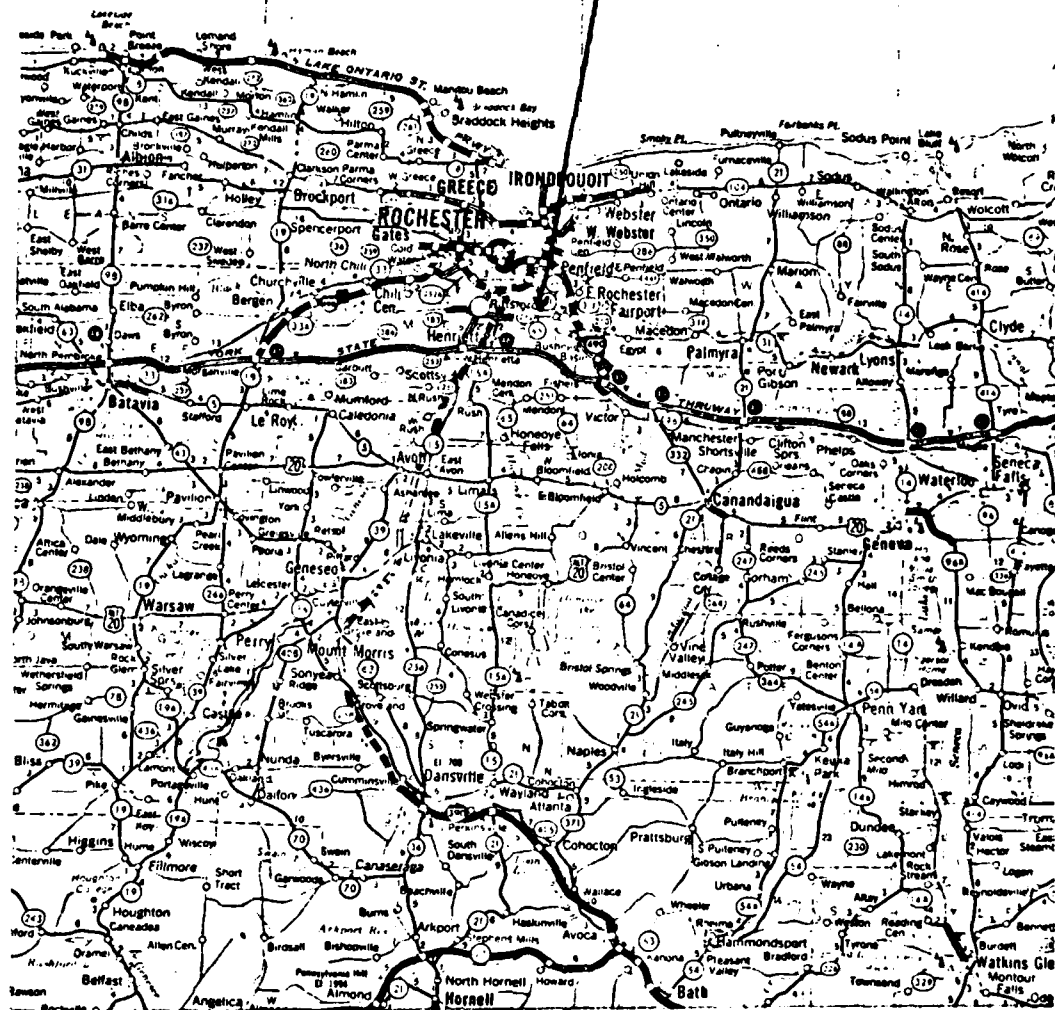
APPENDIX D

DRAWINGS

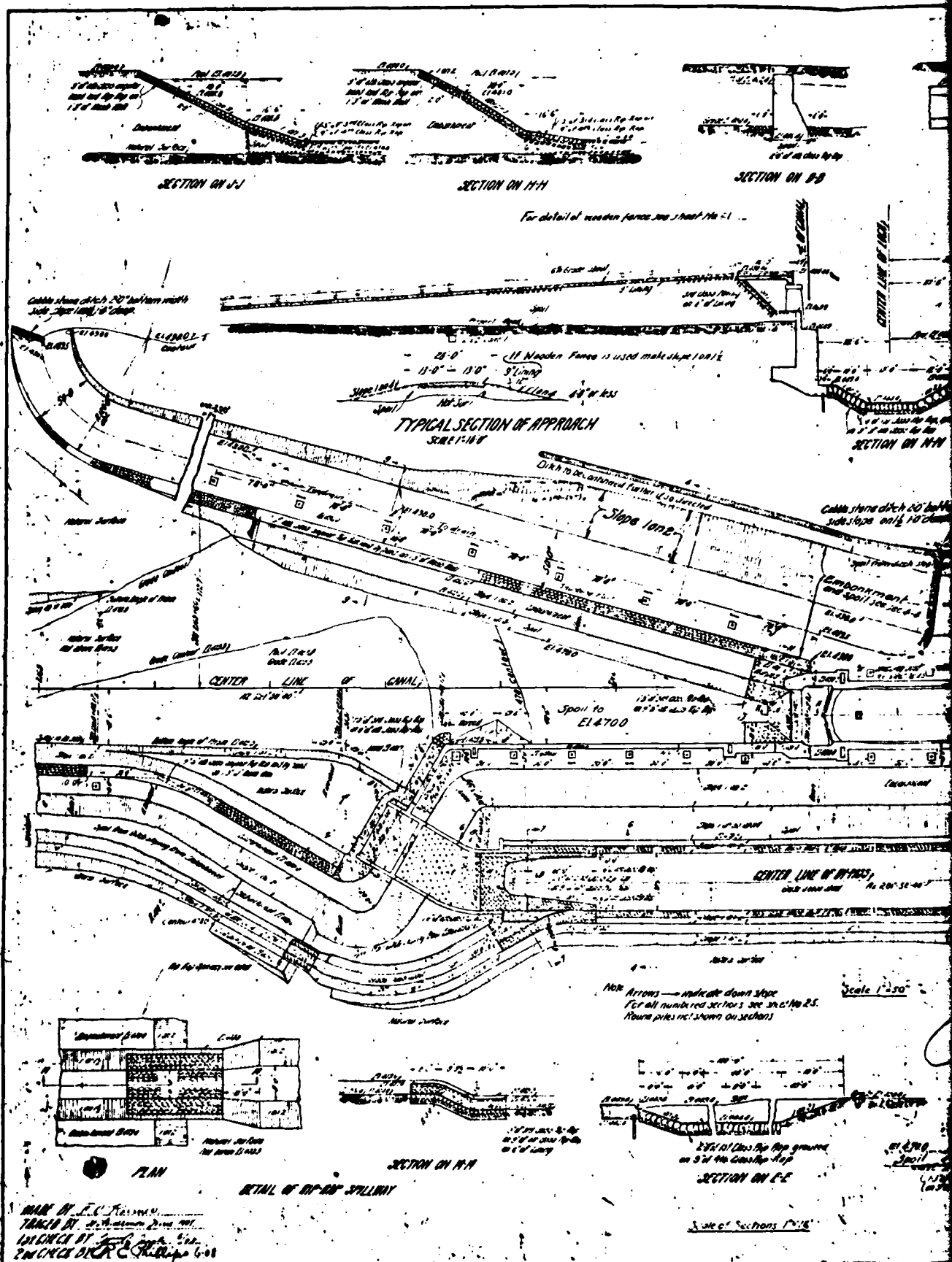


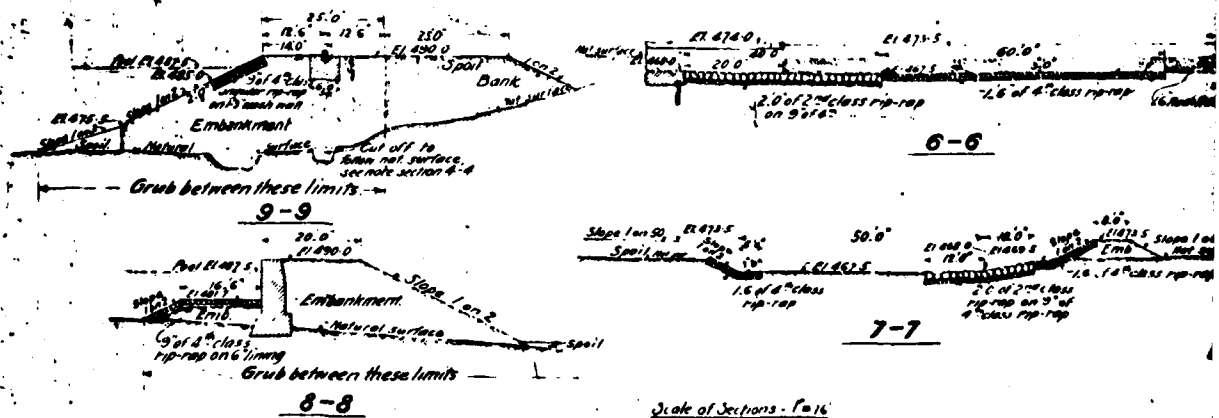
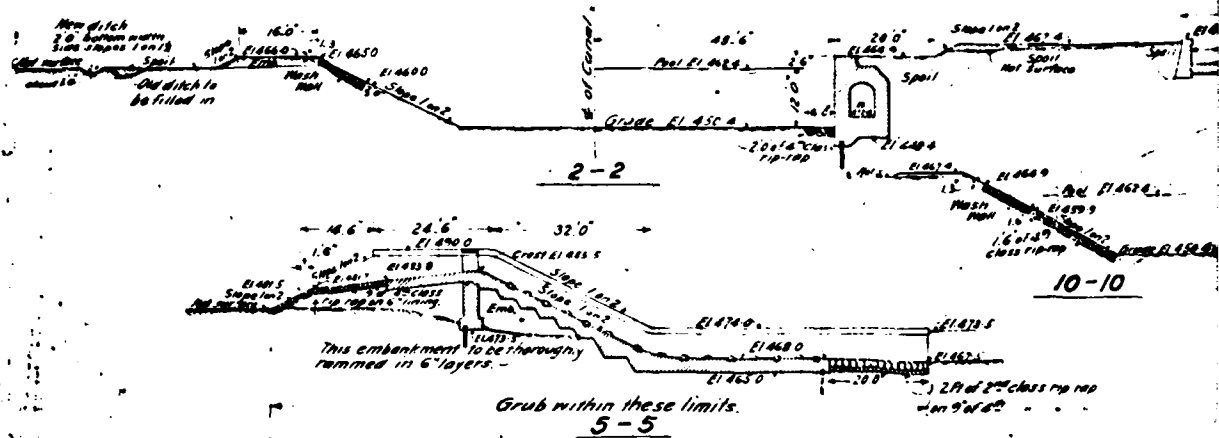
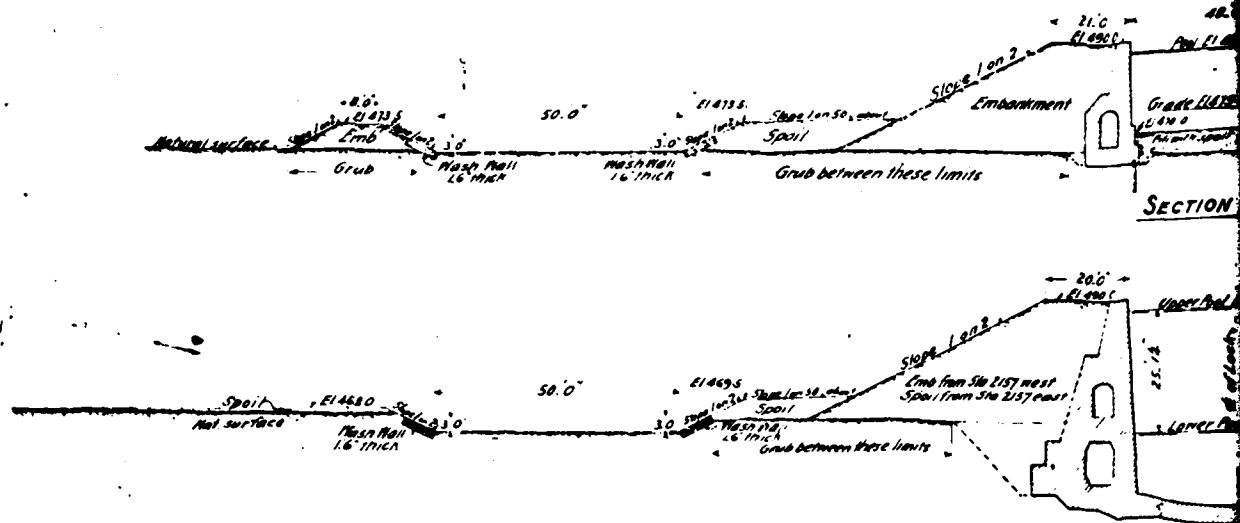
TOPOGRAPHIC MAP
LOCK 32 ERIE CANAL
I.D. NO. N.Y. 791

LOCK SITE



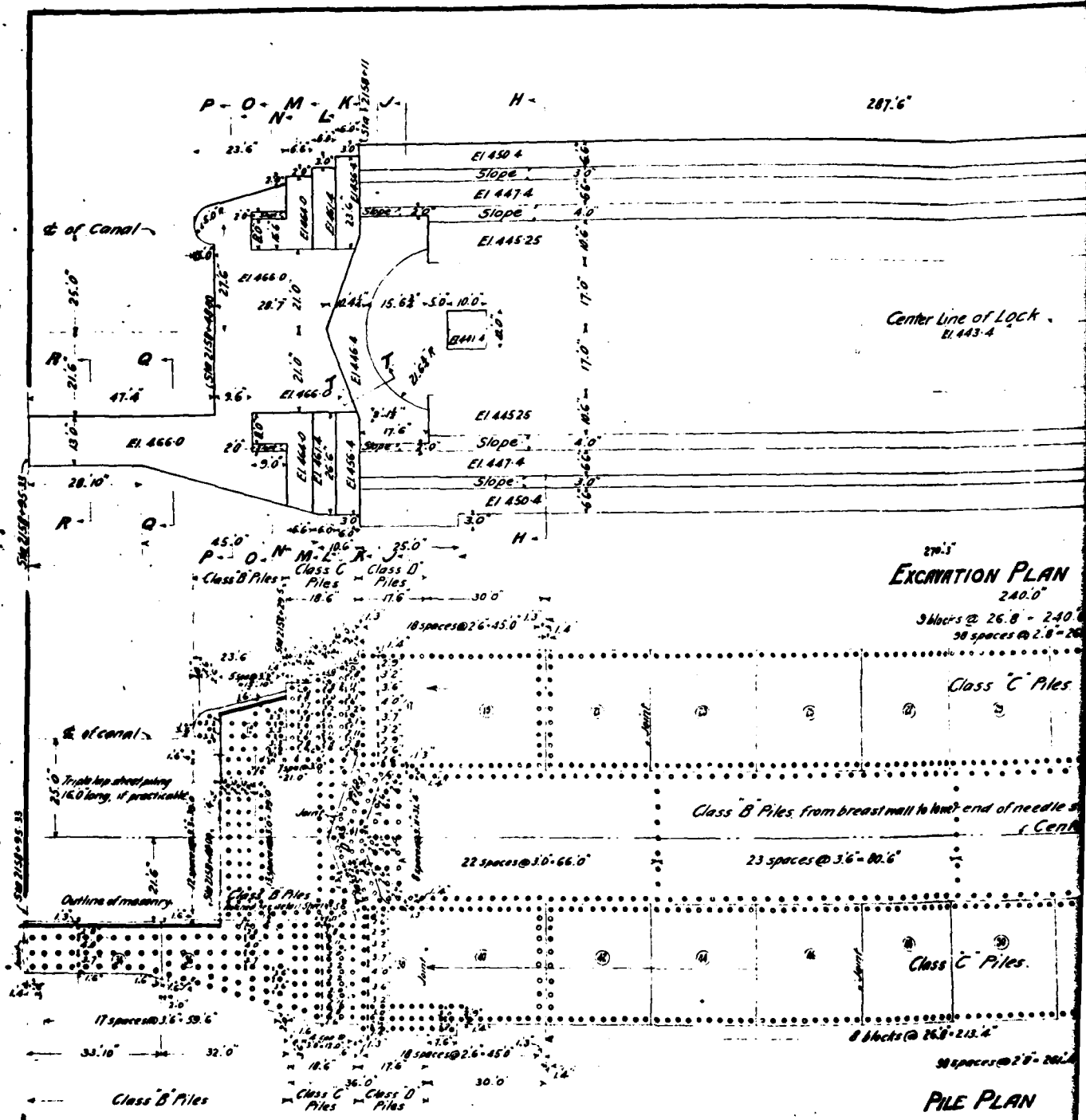
VICINITY MAP
LOCK 32 ERIE CANAL
I.D. NO. N.Y. 791





MADE BY F.C. Hansen
 TRACED BY J.N. Davis 6-12-05
 1ST CHECK BY G.W. Davis 6-12-05
 2ND CHECK BY R.E. Phillips 6-12-05

Scale of Sections - 1" = 16'



Excavation Plan
240.0'

3 blocks @ 26.8' - 240.0'
36 spaces @ 2.8' - 26.8'

Class C Piles

Class B Piles from breast wall to land end of needle

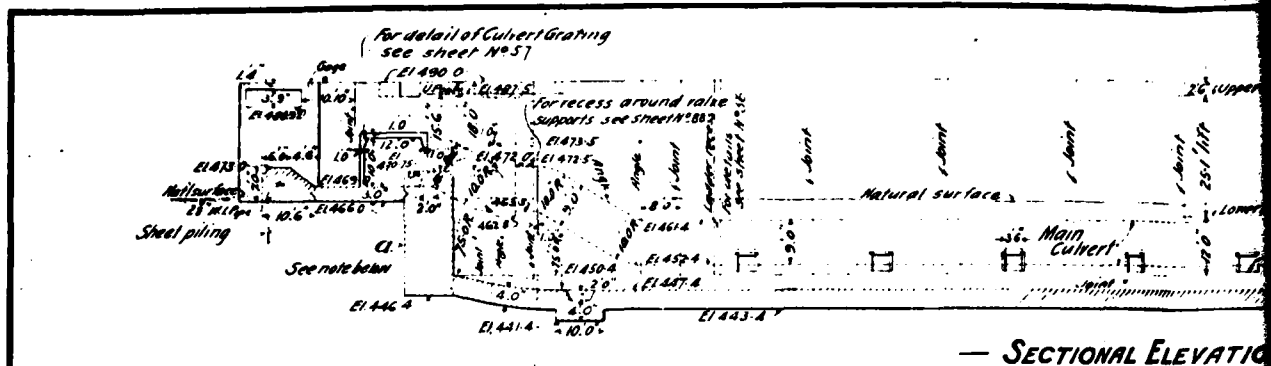
Class C Piles

PILE PLAN

Elevations refer to bottom of concrete.
Round piles to be cut 1.6' above elevations shown.
Length of round piles to be determined by test driving according to specifications.
In case however local conditions are found such that the specified penetration is exceeded, the State Engineer may direct the contractor to drive such additional piles as may be necessary, or to spread and reinforce the footings or to use both methods in order to obtain a stable foundation. All such work shall be done at contract prices, subject to the requirements of the contract regarding alterations.

MADE BY Underhill & Co.
TRACED BY J.K. Lang 5.1.08
1ST CHECK BY O.P. Bullen 5.4
2ND CHECK BY J.C. Kelly 5.1

Triple
See
Within
for
in place
Spaces
so req
emb
Top of
excav
Sec 5



Sheeting shall be used during construction, as far as practicable, to maintain surfaces marked "A".

The following sections shall each be built as a monolith and work once begun thereon shall be continued without interruption until the section is completed viz:-

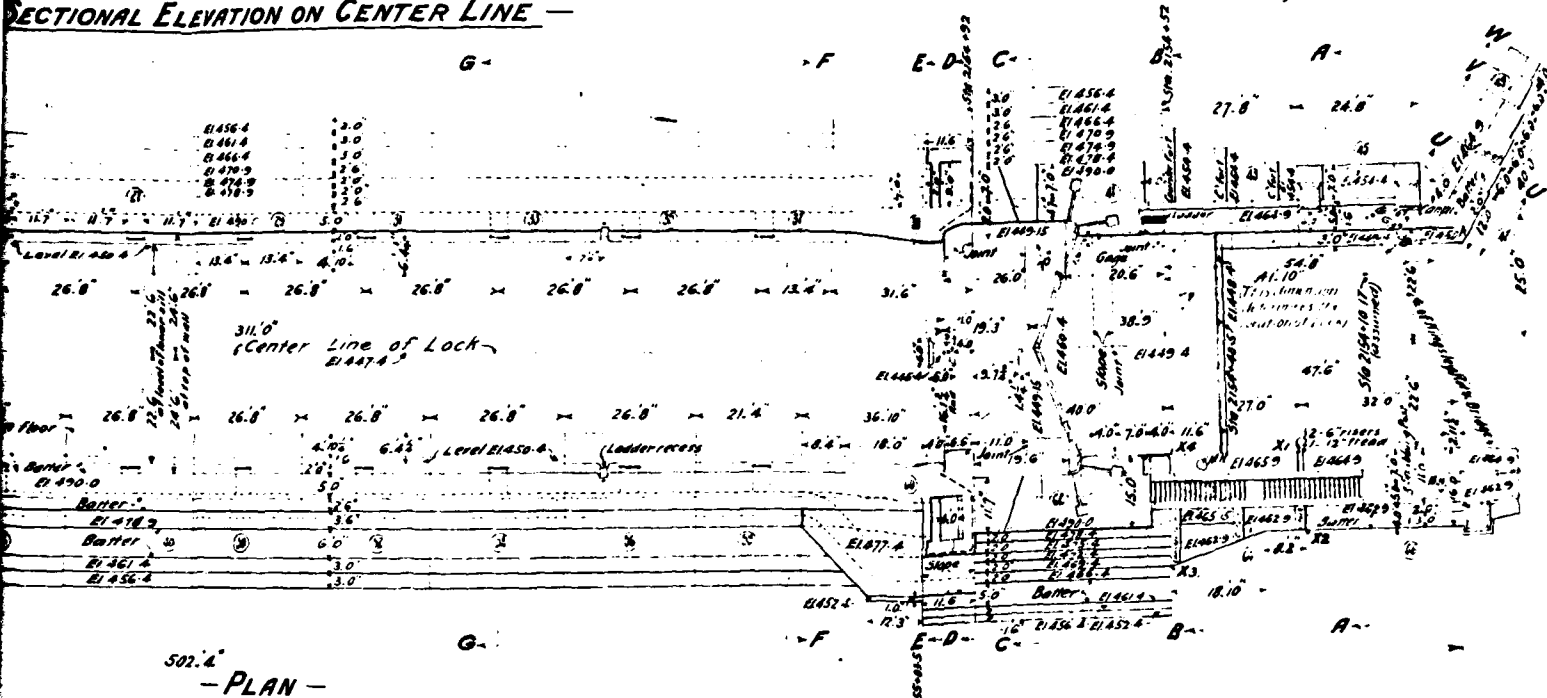
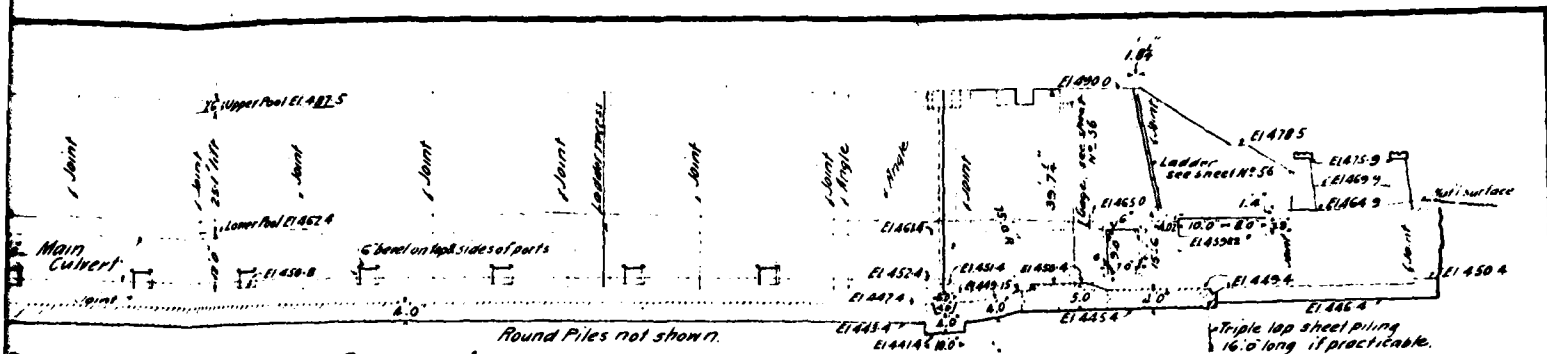
Side wall between limits of X₁, X₂, X₃ & X₄ from EI 457.9 to EI 465.9
Y₁, Y₂, Y₃ & Y₄ EI 480.0 to EI 491.0
Both thrust walls bet Stns. 2154+52 & 2154+92 EI 484.0 to EI 490.0
2157+93.82 to 58+29.5 EI 486.0 to EI 490.0

Spaces under and around masonry shall be backfilled, where so required, with material placed as specified for forming embankment.

The floor shall be built dividing lines at right angles of lock. Each section shall monolith

The bases of structures shall be plans of this contract shall be approximate only, and may be altered by the State Engineer in vertical elevation and of any dimension on a proper foundation.

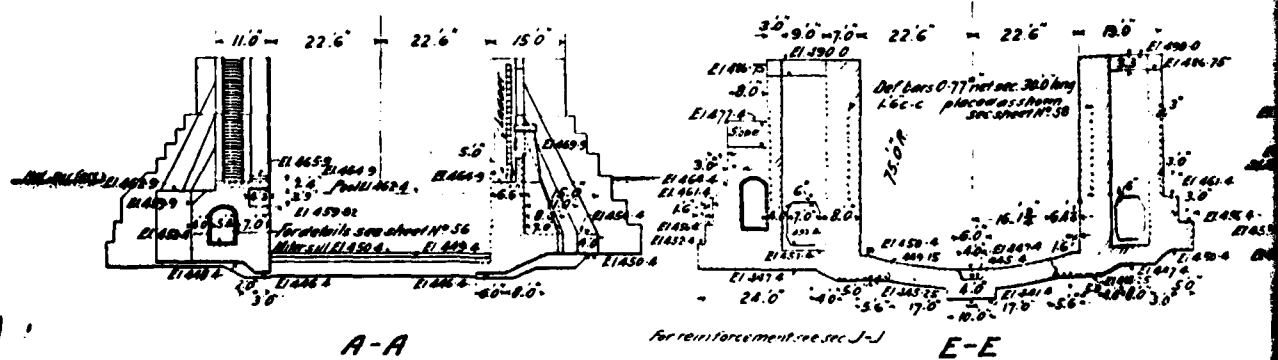
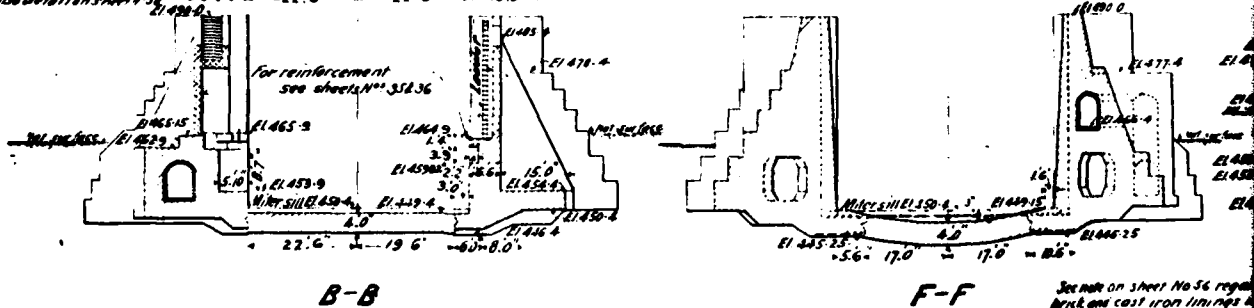
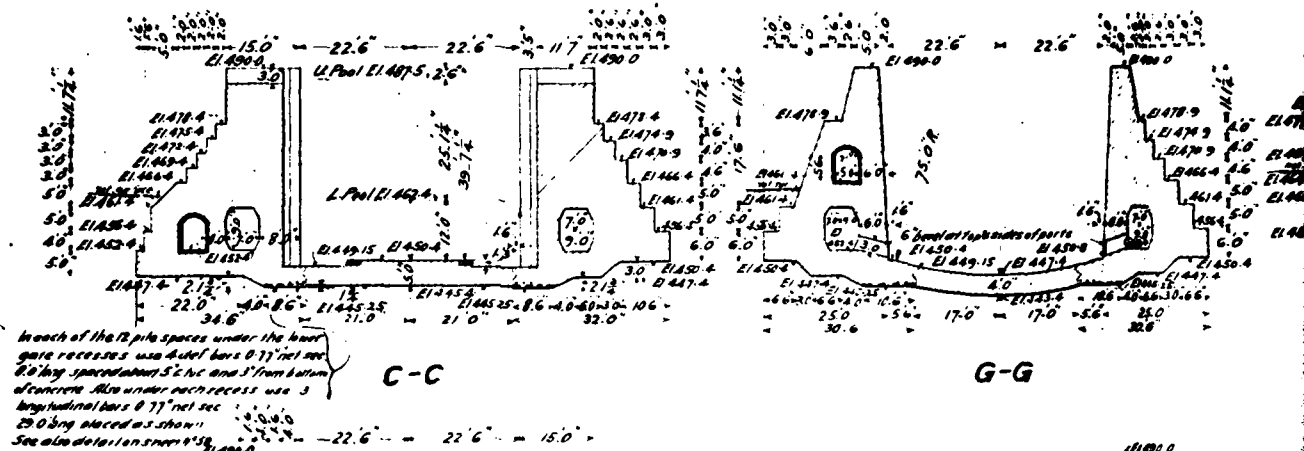
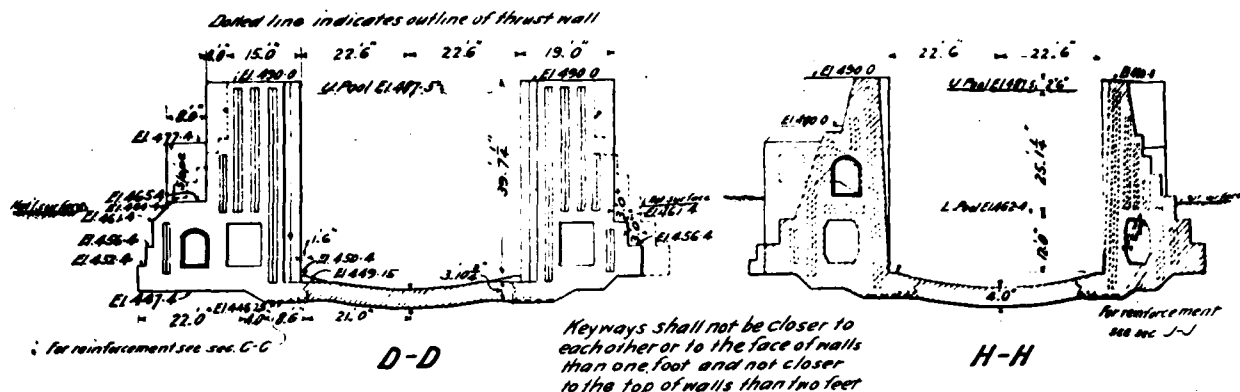
MADE BY O.F. Bellows 3-08
TRACED BY J. H. Bellows 4-22-08
1ST CHECK BY Underhill 7-01
2ND CHECK BY G. R. Zandy 7-01



The floor shall be built in sections with dividing lines at right angles to center line of lock. Each section shall be built as a monolith.

The bases of structures shown on any of the plans of this contract shall be considered as approximate only, and may be ordered by the State Engineer in writing to be at any elevation and of any dimensions necessary to give a proper foundation.

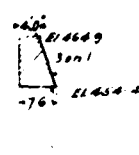
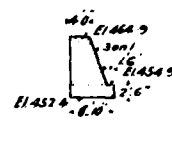
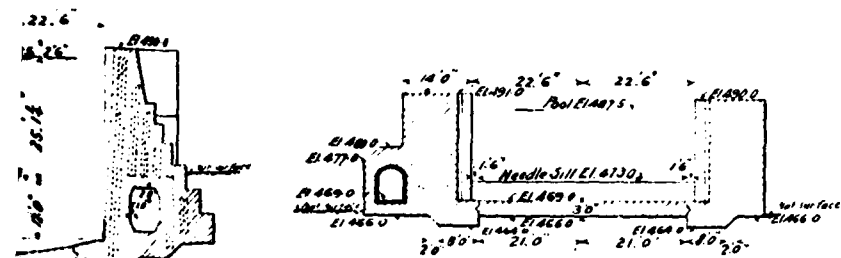
For directions relating to modification of foundations see sheet N° 30
For detailed dimensions of Lock enas see sheet N° 33 & 34
Top of Lock walls to be crowned $\frac{3}{4}$ inch.
Top edges of all walls are to be rounded to a radius of 2" unless otherwise shown
for reinforcement of toe of chamber walls, and lower thrust walls see sheet N° 32 & 33



MADE BY O.S. 10/23/34
 TRACED BY J.H. 10/23/34
 1ST CHECK BY Underhill
 2ND CHECK BY L.R. 10/23/34

Masonry shown on this sheet shall be second class concrete except where otherwise shown as reinforced concrete
 Top of lock walls to be crowned $\frac{3}{8}$ inch

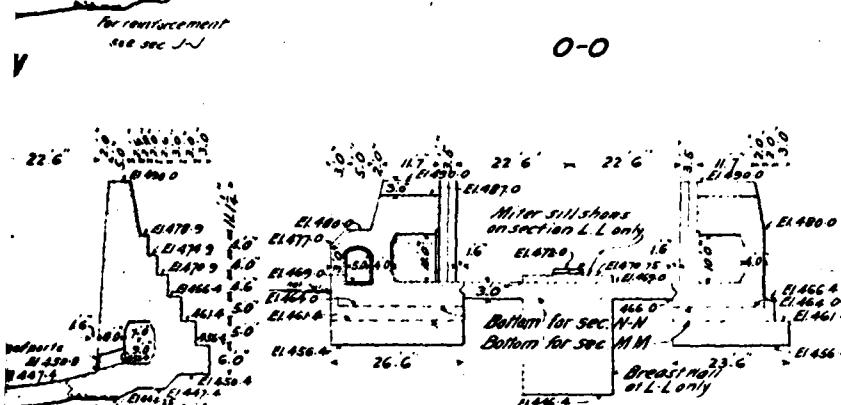
Top edges of all walls are to be rounded to a radius of 2 inches unless otherwise shown
 For directions relating to modification of foundations see sheet N° 30
 For additional notes see Lock Drawing Sheet N° 31



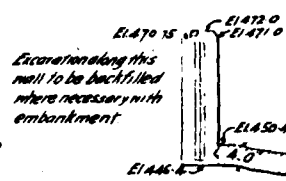
U-U

V-V

W-W

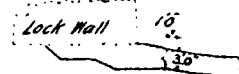


O-O



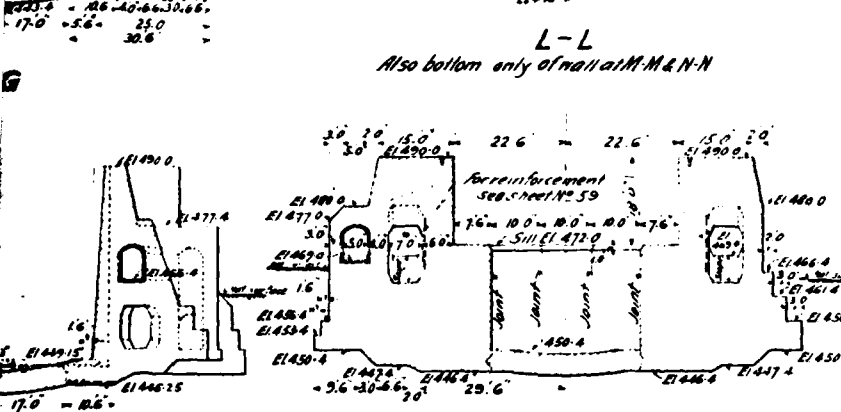
T-T

If the floor and the footings of any part of the walls are built at the same time, the joints between them shall be made as shown by this sketch. Groove to be cleared out and filled with concrete after adjacent wall has been completed long enough to take care of any settlement.



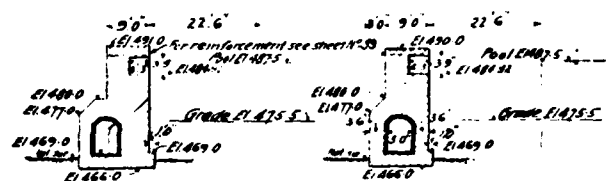
1x12 boards.

FORM FOR KEYWAY



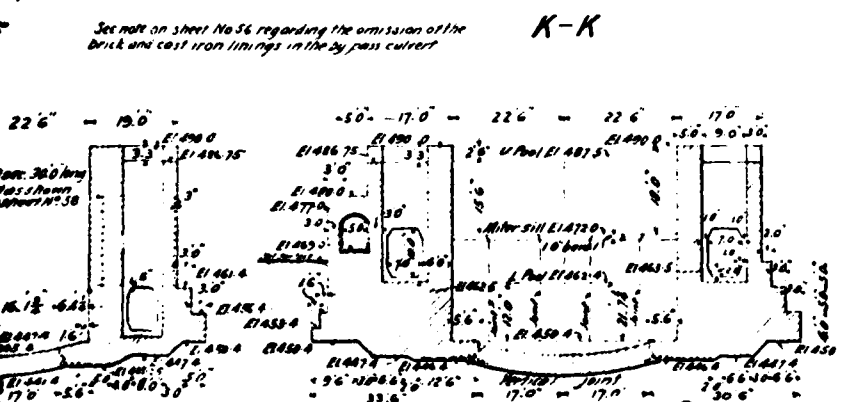
L-L

Also bottom only of wall at M-M & N-N

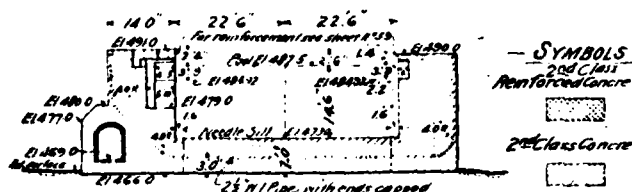


Q-Q

R-R



K-K



P-P

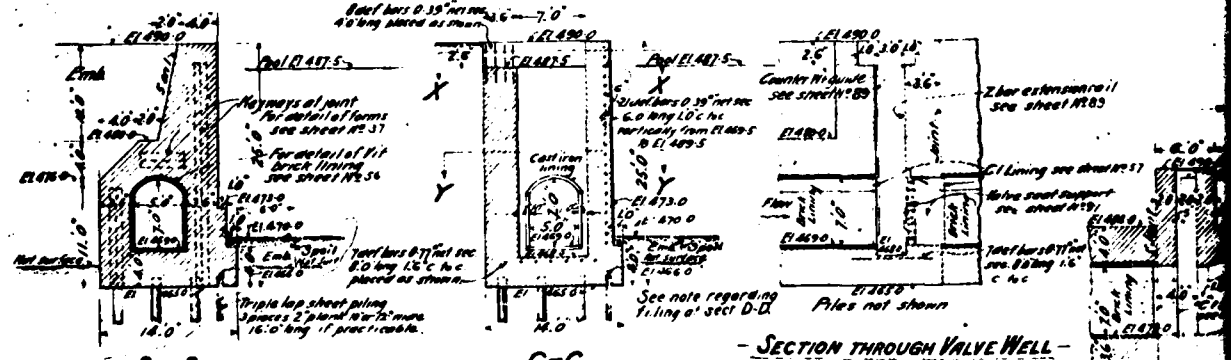
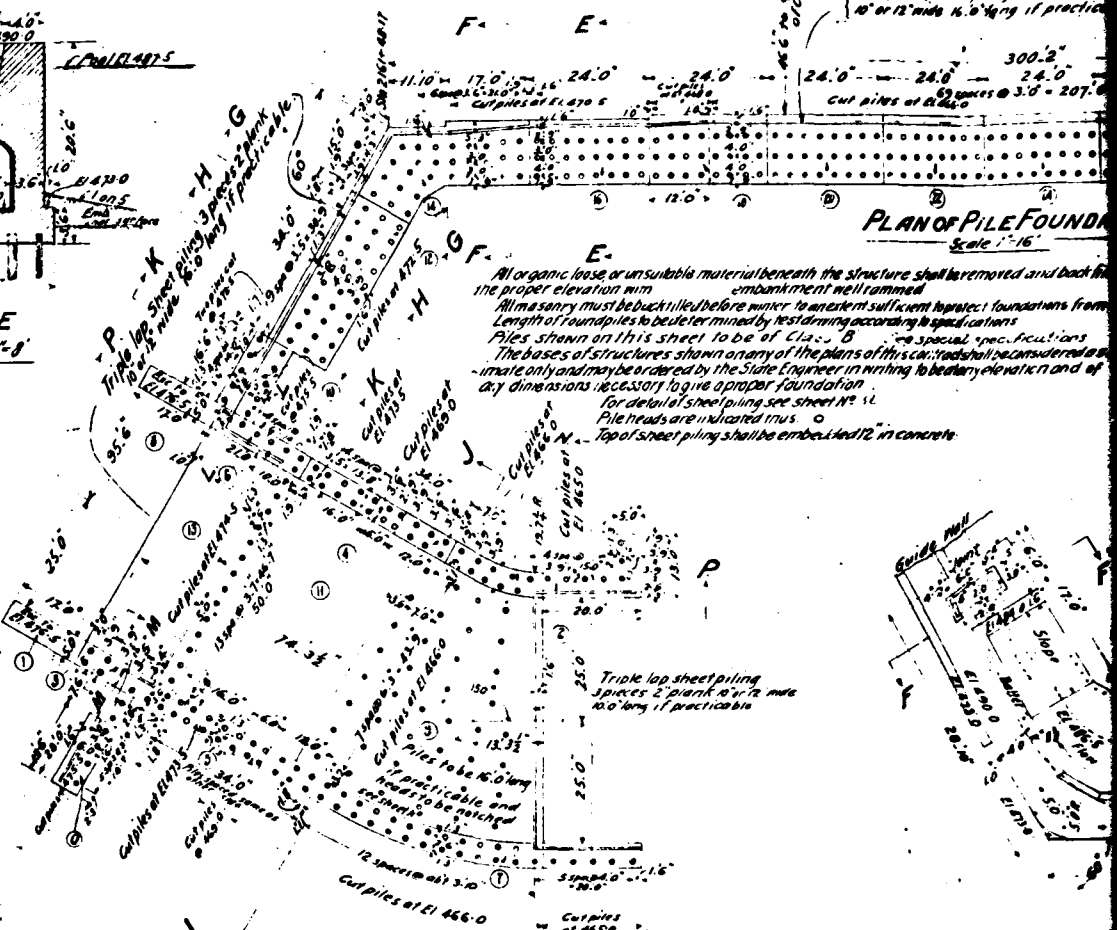
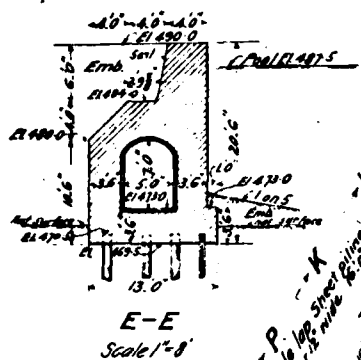
| SYMBOLS | |
|--------------------|---------------------|
| 2nd Class | Reinforced Concrete |
| 2nd Class Concrete | |

To be rounded to a radius
as shown
To modification of Town-
ship
Lock Drawing Sheet No. 31

In each pile space under toe of chamber wall from the lower
gate recess to angle of breast wall use 4 steel bars 0.77" net
section 10.0 long spaced about 6" C to C and 3' from bottom of
concrete, also place three rows of bars 0.77" net section with
ends lapped not less than 3.0' spaced as shown. See also section sheet No. 30

Contract No. 23.
Erie Canal
Section 9.
From Kings Bend to the Genesee River.
SECTIONS OF LOCK 32
Scale: 16 feet to 1 inch.

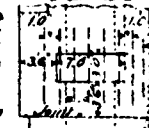
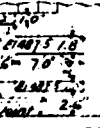
Designed and approved
by
Civil Engineer



D-D
Filling for 6" in front of wall must be thoroughly rammed. All filling in front of wall must be done before the embankment back of wall is carried above EL 476.0

C-C
Gate bars 0.39" net sec. 4.0' long placed as shown.

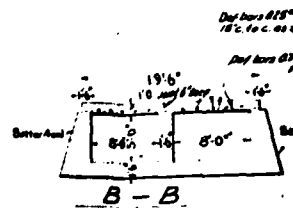
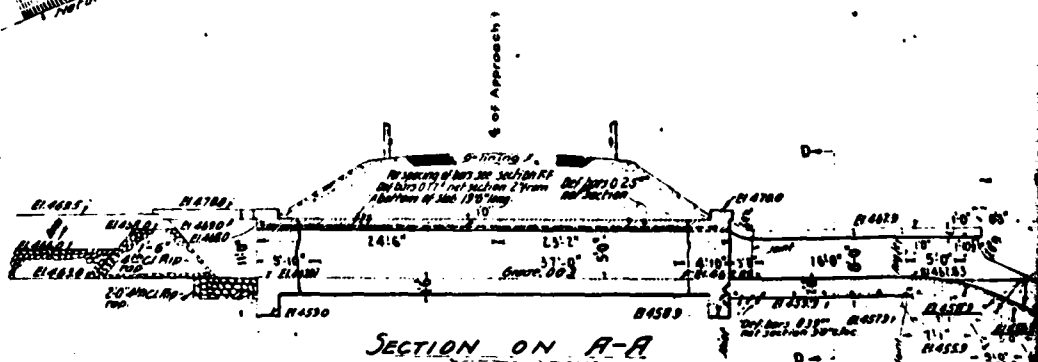
Details of rebar for support of cover plate will be furnished later



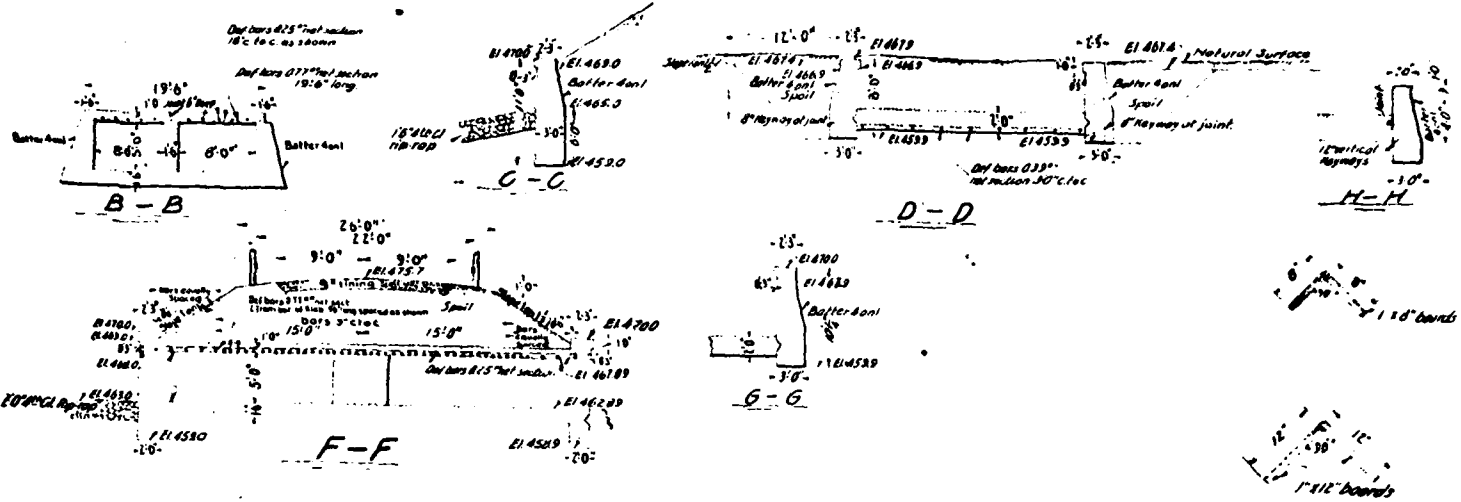
SECTION RECESS

MADE BY F.C. Hammer
CHECKED BY J.H. Kline, Jr. - 1/10/11
1ST CHECK BY J.H. Kline, Jr. - 1/10/11
2ND CHECK BY J.C. Phelps - 6/15/11

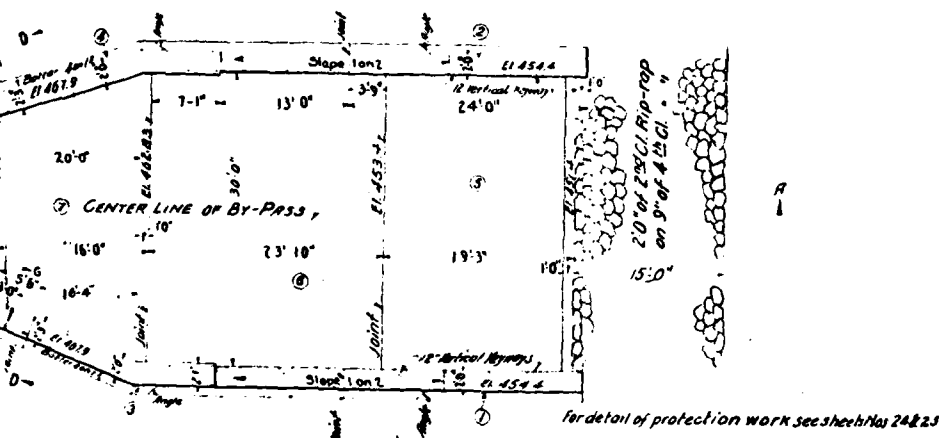
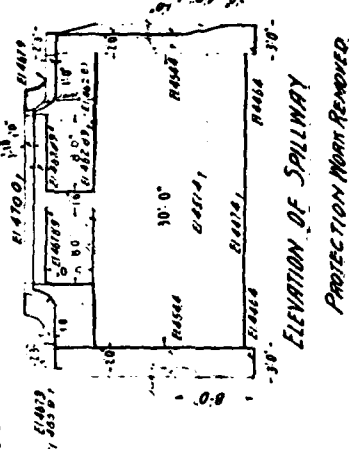
Scale 1"=8'

[illegible]

MORN BY J. L. Kaspery..
 TRACED BY J. L. Kaspery..
 SCHEIDT BY J. L. Kaspery..
 3-CHUCK BULL J. L. Kaspery

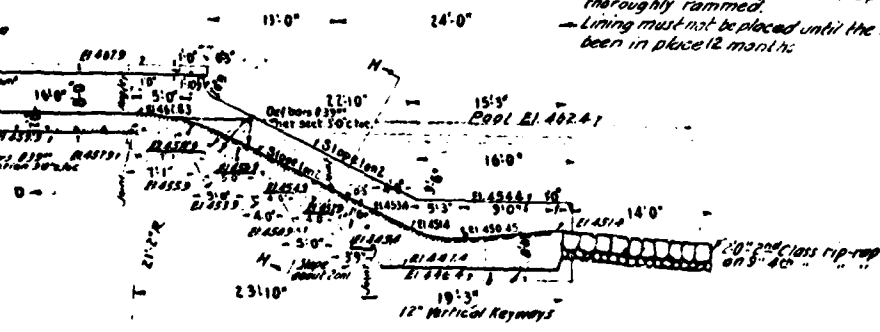


DETAIL OF FORM FOR KEYWAYS
Scale 1"=10'



All masonry shown on this sheet to be 2nd Class concrete
The bases of structures shown on this plan shall be considered as approximate
only and may be ordered by the State Engineer in writing to be of any
variation and of any dimensions necessary to give a proper foundation

All exposed edges to be rounded to a radius of 2' unless otherwise shown.
All organic matter loose or unsuitable material beneath the structures shall
be removed and back filled to the proper elevation, with embankment
thoroughly rammed.
Lining must not be placed until the material on which it rests shall have
been in place 12 months



Contract No. 23.
Erie Canal Section 9.
From Kings Bend to the Genesee River.
**LOWER SPILLWAY & CULVERT UNDER
KINGSLEY ROAD LOCK 32**
Scales as indicated.

Examined and approved
Special Deputy State Engineer